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ABSTRACT

Ten Veterans Administration hospitals in Appalachia participated in five biomedical communication experiments using the Advanced Technology Satellite (ATS-6). Material was collected and evaluated by both questionnaires and interviews with the medical staff of the 10 hospitals. The five experiments were conducted in the areas of: (1) video seminars, (2) grand rounds, (3) teleconsultation, (4) out-patient clinics, (5) computer-assisted instruction. The programs studied and the hospitals participating in the satellite experiment are appended. A 7-item bibliography is included. (Author/DS)

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USING ATS-6 FOR CONTINUING MEDICAL EDUCATION AND HEALTH CARE IN APPALACHIA

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USING ATS-6 FOR CONTINUING MEDICAL EDUCATION AND HEALTH CARE IN APPALACHIA

BACKGROUND

Many future developments in biomedical communications will be based on the outcomes of the demonstration programs using ATS-6. The Advanced Technology Satellite presents an undertaking of major significance. National and international attention is focused on this advanced communication delivery system. Such heightened interest makes it all the more important to document and evaluate its effects on continuing medical education and health care.

The Appalachian region is one of three areas chosen for ATS-6 experiments during its year of broadcasts to the United States. Its mountainous terrain creates remote communities. Many of the citizens of these towns receive medical care at their local Veterans Administration hospital. To compensate for the remoteness from large medical centers, the Veterans Administration has long provided its hospital staffs with a variety of continuing education services. In line with this general philosophy, the VA wanted to test the potential for biomedical communication via satellite for its hospitals. For the first time, it seemed possible to circumvent the problem of difficult and expensive communications among remote hospitals and to medical centers. The VA chose ten hospitals to participate in five biomedical communication experiments.

Foundation for Applied Communication Technology, a non-profit California corporation is the VA's administrative/coordinative agent for the ATS-6 project. It is responsible for the design, production, and distribution of weekly programs, as well as coordination of the various agencies, organizations, and individuals involved in the project. Production of films and videotapes takes place at the National Medical Audiovisual Center in Atlanta, Georgia. Live portions of programs originate from Denver, Colorado.

Applied Communication Research, a non-profit corporation in Palo Alto, is the subcontractor responsible for evaluation of the VA sponsored ATS-6 biomedical communication experiments. Questionnaire design and analysis takes place in Palo Alto. A field representative as well as consultants travel to the ten hospitals for interviews with the medical staff. An evaluation coordinator in each hospital helps distribute and collect questionnaires.

CONCEPTUAL FRAMEWORK

Our effort to document and evaluate the effects of the ATS-6 experiments on health care in Appalachia relies on the following approach:

1. Multidimensional conceptualization of effect.

   Effect of the various biomedical communication experiments are explicated into four categories or variables. These are knowledge, attitude, utilization, and behavior.

2. Multiple measurement of each effect dimension.

   Our experience in other evaluation studies warns against "single operationism," that is, a ratio of one measurement procedure per "finding." This is necessary to reduce problems of acquiescence, willful distortion, other biases, and simple error of measurement (e.g. misinterpretation).

   Since each measurement procedure embodies biases and defects that cannot be detected internally, we rely on both direct and indirect measurement methods.

3. "Convergent-discriminant validation" of the multiple measurement approaches, per finding.

   A rigorous framework for measurement validation is provided by the Campbell-Fiske "multitrait-multimethod matrix" (1959). Like factor analysis, the multitrait-multimethod matrix is a preliminary analysis tool that distills a subset of reliable and valid measurement for further analysis and reporting of findings.

4. Use of quasi-experimental design to control both internal and external threats to validity while maintaining cost effectiveness.

   Campbell and Stanley (1963) spell out the various threats to validity. They enumerate eight factors affecting internal validity and four factors jeopardizing external validity. Listed below are those relevant for this project:

   A. HISTORY, the specific events occurring between the first and second measurement in addition to the experimental variable. For instance, a visiting physician may make a presentation that covers material also brought to the hospital via ATS-6. Or a nurse joining the staff might help bring about

certain behavioral changes. If the knowledge gain or new behaviors coincided with changes 'hoped for' in the experiment, we might erroneously assume ATS-6 programs caused the results.

History can be called an alternative explanation. It is a factor influencing the internal validity of the experiment. And although we cannot control these naturally occurring events, we can monitor their occurrence. We maintain an awareness of these events through our interviews and through hospital documentation such as newsletters and lists of continuing education events.

B. TESTING, the effects of taking a test upon the scores of a second testing. Unfortunately, the process of measuring may change what is being measured. This threat is difficult to control. We are using a variety of measurement approaches as our best solution.

C. INSTRUMENTATION, in which changes in the calibration of a measuring instrument or changes in the observers or scorers used may produce changes in the obtained measurements.

We have trained our interviewer and rely primarily on his reports which leads to a consistency in question asking. Except where additional items are needed, we rely on a measurement instrument and do not change it.

D. SELECTION, resulting from the self-initiated participation of certain hospitals and certain individuals within hospitals. This factor poses a threat in that participants always differ from non-participants.

During our site visits, we interview both participants and non-participants and try to discover factors leading to the decision to attend programs.

Factors threatening external validity are:

E. INTERACTION EFFECT OF TESTING, in which a pretest might increase or decrease the respondent's responsiveness to the experimental variable and thus make the results obtained for the pretested

population unrepresentative of the effects of the experimental variable for unpretested individuals.

We are controlling for this threat by having only part of the hospital staff complete the pre-experiment questionnaire. We can compare their responses with those who complete only the post-experiment questionnaire.

F. REACTIVE EFFECTS OF EXPERIMENTAL ARRANGEMENTS, which would preclude generalization about the effect of the experimental variable upon persons being exposed to it in nonexperimental settings.

Medical staff and patients alike are aware of their involvement in an experiment. Their reactions may not be typical of medical staff and patients in other VA hospitals where satellite transmissions would be part of a regular and continuing service.

Since this experiment lasts for 11 months from July 1974 through May 1975, we can assume the participants view it less as an experiment during the later, steady-state months. Data from these months can be compared with early data.

G. MULTIPLE-TREATMENT INTERFERENCE, likely to occur whenever multiple treatments are applied to the same respondents, because the effects of prior treatments are not usually erasable.

Many on the medical staffs of the ten participating hospitals see several programs. Some come to each week's broadcast. From our attendance logs, we can send questionnaires to those representing the continuum from little to extensive use.

If this were a true experiment where individuals and hospitals were randomly assigned to experimental or control conditions, we could easily eliminate threats to internal and external validity. However, the ATS-6 biomedical communications experiment in the VA hospitals in Appalachia is, at best, a quasi-experiment. Hospitals have been chosen on other than a random basis (see Appendix A for a list of experimental and control hospitals). All individuals within the hospitals have access to the satellite transmissions. Consequently, we must rely on careful construction of measurement instruments and the use of rigorous analysis procedures to help us overcome many of the threats.

TYPES OF EVALUATION

The ATS-6 biomedical communication experiments in Appalachia are important as well as expensive. We feel that both formative and summative evaluations are necessary to ensure a maximally calibrated set of programs evolve during the experiment and that the overall impact is assessed.

FORMATIVE FEEDBACK. Perhaps the most important function of evaluation in a project of this kind is a continuous flow of effectiveness information from the evaluation team to the production team. In order to be used, such feedback must follow quickly upon the first introduction of produced materials in the field. Formative evaluation procedures are designed to provide such feedback. The same data that serve as baselines or intermediate points for summative evaluation are of great value when tabulated quickly as a separate data series and reported back to the producers. It is acknowledged that such analyses are less rigorous and comprehensive than later analyses that will involve the same data. Turnaround time has greater primacy in formative evaluation than either rigor or comprehensiveness.

The questionnaires and interviews are designed to provide useful information to the production team in modifying or altering material and presentation format.

SUMMATIVE DOCUMENTATION. At the end of each experiment, a different kind of analysis is performed to assess outcomes. Because of limitations in the quantity and quality of experimental control that is possible in a field experiment, the summative evaluation analysis must take advantage of powerful statistical procedures. Rather than focusing on individual programs, we will sum across programs for each type of experiment. Emphasis will be on outcomes of the various experiments and uses made of each.

BIOMEDICAL COMMUNICATION EXPERIMENTS

The VA sponsored biomedical communication experiment using ATS-6 is unique in the large number of types of experiments being tried. Rather than focusing on one or two approaches, there are five experiments. These are: video seminars, grand rounds, teleconsultation, out-patient clinics, and computer assisted instruction. All present some form of medical programming but vary in presentation format, techniques used, target audience, etc. A brief description of each follows:

1. Video Seminars

Each video seminar begins with a short (approximately 20 minute) film or videotape covering the program material. The medical faculty responsible for the content of the program is available at the conclusion of the pre-recorded portion to discuss the material. ATS-6

provides video and audio channels from the broadcast site (Denver) to the hospitals. The hospitals have telephone lines to transmit audio back to the broadcast site. Seminars are prepared for physicians, nurses, and allied health professionals.

2. Grand Rounds

Grand rounds offers live presentation of patients and case histories from the Denver studio. Hospitals ask questions over the telephone. The content is directed to physicians, nurses, and allied health professionals.

3. Teleconsultation with Slow Scan

During each of ten weekly programs, one of the VA hospitals sends case histories, x-rays and other static visual material to Denver via telephone lines using slow scan equipment that travels in a mobile van. Slow-scan was substituted for two-way video linkages, when frequency disputes eliminated two-way video for the ATS-6 experiments. The presenting physicians send additional materials over the phone lines.

During the program period, a panel of specialists discuss the case with physicians at the originating hospital. The other nine hospitals are able to observe the visual material from the presenting hospital and the panelists. All hospitals can participate in the discussions using phone lines, although the experiment is meant to provide direct assistance to the presenting hospital and to provide continuing education to the other hospitals.

4. Out-Patient Clinics

Each out-patient clinic begins with a short film or videotape covering the program material. The medical faculty responsible for the content of the program is available to discuss the material and to answer questions.

The content is directed to patients, their families, and those on the hospital staff who work closely with these patients.

5. Computer Experiments

The major purpose of the computer experiments is to test the reliability and usability of digital information transmitted via satellite. Two computer programs are being used -- a Computer Assisted Instruction simulation program for nurses on coronary care and a patient history and diagnosis program for psychiatric outpatients. The simulation program is being sent to two hospitals, the history/diagnosis program to a psychiatric hospital.

EVALUATION OBJECTIVES. Although each experiment has its own evaluation objectives, the following list summarizes the dimensions involved:

1. Demonstrate ability of satellite to mediate what is usually an interpersonal or face-to-face event.

2. Establish that satellite-mediated event is judged to be useful by primary health care provider/consultant/patient.

3. Establish that primary health care providers feel pertinent information/data is transmitted/received via satellite.

4. Establish that primary health care providers feel they have genuine access to specialists/consultants in Denver (e.g. could ask questions and receive meaningful answers).

5. On dimensions other than usefulness, measure attitudes toward satellite-mediated event on the part of primary health care providers/consultants/patients.

6. Determine level of use of satellite-mediated event.

7. Determine effect of satellite-mediated event on subsequent knowledge/attitude/behavior.

8. Determine effect of satellite-mediated event on quality of health care provided.

Each of these objectives requires a consideration of the relevant dependent variables and the data collection/analysis methods. Again, without referring to individual experiments, the following information for the eight objectives illustrates our approach:

OBJECTIVE NO. 1: Demonstrate ability of satellite to mediate event.

DEPENDENT VARIABLES:

1. Responses to points covering comprehensiveness of information conveyed by presenting health care provider in initial presentation.

2. Responses to points covering adequacy of technical production.

3. Comments made during post-event debriefing.

DATA COLLECTION AND ANALYSIS:

Responses to points will be gathered via a brief questionnnaire immediately after the event. The same type of information will

be gathered from those in the remote hospitals as well as from the consultants in Denver. Emphasis is on technical adequacy of the event. Some interviews will be conducted immediately after the broadcast. They provide anecdotal evidence.

Responses will be tabulated. Where appropriate the different perspectives will be kept separate (e.g. presenting hospital in teleconsultation experiment, consultant in Denver, non-presenting hospitals). Summary statement will reflect on adequacy of the satellite to mediate the event.

OBJECTIVE NO. 2: Establish that satellite-mediated event is judged to be useful by primary health care provider/consultant/patient.

Those involved in the experiment will have a number of attitudes toward the event. Most of these attitudes will be tested under Objective #5. However, the overriding dimension of judged usefulness needs to be measured throughout the experiment. Control variables (e.g., background and characteristic caseload) figure prominently in the summative analysis of this objective.

DEPENDENT VARIABLES:

Respondents are asked to answer the following questions:

1. Types of content/cases judged to be useful.

2. Types of content/cases judged to be not at all useful.

3. Ratio of #1 to #2 for the set of programs of each experiment.

DATA COLLECTION AND ANALYSIS:

A few items will be designed to clarify the "useful"/"not useful" dimension. A post-viewing questionnaire as well as a retrospective questionnaire will obtain this information.

Data on "useful" and "not useful" content/cases will be tabulated separately, then combined as a ratio. Independent variables of professional age, medical specialty, etc. will be introduced to show differentiation in "useful"/"not useful" judgments.

OBJECTIVE NO. 3. Establish that primary health care providers felt pertinent information or data is transmitted/received via satellite.

This objective deals primarily with the teleconsultation experiment

and highlights the satisfaction or frustration in presenting cases to remote consultants. Technical problems associated with the communication linkage, as well as physical and possibly cultural distance separating the primary health care providers from the Denver specialists, may result in feelings of frustration. Apart from other attitudes, this objective concerns their felt efficacy in presenting cases.

DEPENDENT VARIABLES:

The presenting health care provider discusses success in communicating significant aspects of:

1. Patients' histories.

2. Patients' present conditions and their antecedents, as presented verbally.

3. Patients' present conditions, using slow scan equipment.

4. The range of care options that are realistic from a local perspective.

5. The range of care options that particular patients can be committed to.

DATA COLLECTION AND ANALYSIS:

These questions are combined with others in a questionnaire that is completed by each presenting health care provider. The questionnaire calls for a summarization of feelings.

Responses will be quantified and analyzed as quickly as possible, so the formative evaluation goals can be met as well as the summative evaluation goals.

OBJECTIVE NO. 4: Establish that primary health care providers feel they have genuine access to specialists/ consultants in Denver (e.g. could ask questions and receive meaningful answers).

Effective communication for the experiments depends on a perceived two-way flow. Physical and cultural distance factors as well as technical arrangements may cause the health care providers to be disappointed in the event. If questions cannot be easily asked, then negative attitudes may largely determine any future utilization of the service.

DEPENDENT VARIABLES:

The health care provider discusses success in:

1. Asking questions, with ease.

2. Receiving answers that clarify/amplify.

DATA COLLECTION AND ANALYSIS:

These questions are combined with others in a post-viewing questionnaire that is completed immediately after each program.

Interviews conducted in the VA hospitals will determine general feelings about ability to interact with consultants in Denver and overall satisfaction with access to these specialists.

Responses will be quanitified and analyzed. Data from each program will be tabulated by hospital as well as across all hospitals. This information will be used for formative evaluation to help direct future development of the experiment. At the conclusion of each experiment, all data will be summed across programs to provide summative evaluation.

OBJECTIVE NO. 5: On dimensions other than usefulness, measure attitudes toward satellite-mediated event on the part of primary health care providers/ consultants/patients.

Assuming that future utilization of satellite services depends on a cluster of attitudes on the part of those in the hospitals, data gathered to meet this objective will primarily serve the summative evaluation function.

DEPENDENT VARIABLES:

Beyond usefulness and send-receiving perceptions, germane attitudes include:

1. Perceived acceptance of viewing/use as a legitimate activity for self.

2. Perceived acceptance of viewing/use as a legitimate activity for others.

3. Reflection of viewing/use on competence.

4. Reflection of viewing/use on progressiveness.

5. Short-term and long-term implications of experiment for the way medicine is practiced in hospital.

6. Perceived potential for satellite-mediated event.

DATA COLLECTION AND ANALYSIS:

Because the questionnaire needed to tape a range of attitudes is necessarily not brief, this objective will be met by means of personal interviews and mail questionnaires sent to a sample of health care providers in each site.

An attitude battery will be constructed and will be pretested. Respondents will be asked to focus on specific programs only as a way of recalling format and content. Most responses will call for generalizations across several programs.

OBJECTIVE NO. 6: Determine level of use of satellite-mediated event.

This objective calls for use of hospital collected information on number of people attending individuals programs per experiment as well as use of data on patterns of question-asking. We can determine frequent and infrequent viewers according to medical specialties, staff position, field sites, VA affiliation, etc.

DEPENDENT VARIABLES:

1. Number of programs broadcast per experiment.

2. Number of viewers per broadcast.

3. Pattern of questioning per program.

DATA COLLECTION AND ANALYSIS:

Data meeting this objective are drawn from attendance logs for the individual hospitals. The field staff will note discrepancies between attendance at the first of the session and numbers remaining at the end of the session. This kind of discount factor will be applied to the final analysis of utilization. Pattern of questioning will be determined from individual interviews, questionnaires, and staff in Denver.

Utilization findings will initially be taken as the number of people returning questionnaires. Attendance logs will correct those figures and final estimates will be based on what is learned about flow during the programs. Utilization

findings will be reported only in terms of medical specialties, staff positions, affiliation, etc.

OBJECTIVE NO. 7: Determine effect of satellite-mediated event on subsequent knowledge/attitude/behavior.

It is an impossible task to construct a knowledge test for each program that could be administered in a pre-program and post-program version. The task is impossible because of the necessity of having information well in advance of the broadcasts and because regular pre-post testing leads to sensitization and multiple-treatment interference.

A second obstacle to direct pencil-and-paper measurement is the hospital staff themselves. We know they are unwilling to take tests on factual knowledge gained. Even if some consented, the evaluation staff would have to be concerned with the amount of time 'test-taking' would take away from patient care. In general, the same points apply to attitudes and behaviors regarding specific program content.

There does not seem to be a single solution to the inaccessibility of data to answer this objective. Instead we rely on pieces of information gathered from retrospective questionnaires, from interviews, and from critical incidents. We will furnish the health care providers with maximum opportunity to mention any knowledge gain, attitude change, and behavior change.

Since films and videotapes are prepared similarly to other audio-visuals used and tested for knowledge gain in VA hospitals, we feel comfortable that knowledge is imparted this way. We will try to focus on expressions of how knowledge was used, etc.

DEPENDENT VARIABLES:

1. Kind of knowledge gain.

2. Kind of attitude/behavior change.

3. Amount of knowledge gain.

4. Extent of attitude/behavior change.

DATA COLLECTION AND ANALYSIS:

Questions will be included in written questionnaire, when possible, and the field representative will elicit information on knowledge, attitudes, and behavior during interviews.

Final reporting may take the form of mini-case studies,

rather than numerical summaries. This is especially reasonable since the evaluation team is unable to do long-term follow-up. It may be difficult to see many changes in a short amount of time.

OBJECTIVE NO. 8: Determine effect of satellite-mediated event on quality of health care provided.

Although the teleconsultation experiment intervenes directly in the patient care process, most experiments provide information that may or may not be related to any patients currently being cared for. In these cases, it is unreasonable to expect that average patient care will be significantly affected by the event.

Therefore, we must evaluate this objective with the more subtle data of health care providers' perceptions and recalling of critical incidents.

DEPENDENT VARIABLES:

1. Health care providers' responses to questions about any perceived changes in their medical practice that can be traced to information acquired during experiment.

2. Number of critical incidents.

DATA COLLECTION AND ANALYSIS:

A member of the evaluation team will make appointments with health care providers who have participated in various programs. Medical faculty in Denver will be queried about possible critical incidents that have come to their attention.

Data pertaining to perceived influence of event on patient care will be tabulated, when possible, using number of programs seen as a control variable. Data gathered about critical incidents will be used as case study information.

SELECTED PRELIMINARY RESULTS

We have some results from all experiments with the exception of the computer experiment that is just now getting underway. To date, we have gathered information in the following ways:

1. Pre-experimental questionnaire directed to medical staff that determined demographics, major information need areas, important information sources, frequently used information sources, and attitudes toward potential of satellite-mediated events.

2. Hospital profiles of experimental and control hospitals with staff providing information on hospital variables (age, number of beds), staff variables (number in different positions), patient variables (average patient load, number, average length of stay), additional medical support variables (number of nearby hospitals, associated physicians, number of consultants, etc.), continuing education opportunities variables (library, dial access, audiovisuals, lectures).

3. Brief program specific questionnaires completed at the end of each program that determine perception of broadcast (technical quality, content, adequacy of discussion arrangements), evaluation of printed materials, and usefulness of information.

4. Two retrospective questionnaires, each covering approximately ten weeks of programs. These determine which programs were seen, which were discussed with colleagues, how individual programs were rated, use of information, any changes brought about by specific programs, and programs designated as best or worst.

5. Interviews with hospital staff in both experimental and control hospitals in which reactions, problems, and changes are elicited.

6. Observations of broadcasts from which reactions, technical problems, and audience turnover are determined.

Following is a sample of data from each of the four experiments that are currently being conducted. The complete list of topics presented in the broadcasts can be found in Appendix B.

VIDEO SEMINARS. Coronary Arteriography was the subject of a video seminar broadcast to all ten experimental hospitals on October 9, 1974. It was chosen as an example of a program that was attended by almost equal numbers of VA physicians and nurses. The total number completing the questionnaire at the end of the program was 200. This number is used as the most conservative estimate of the number of viewers. Actual audience was as much as 25 percent larger. Viewers included VA and non-VA personnel in several staff categories. Data is presented only for the VA physicians and nurses. Sample size for the non-VA staff for a single program was small enough to make percentages unstable. Percentages are shown for the most positive responses only. Total number answering the question is shown in parentheses below the percentage.

	M.D.	Nurse
Technical Aspects were GOOD	86%	81%
(Total number responding)	(64)	(68)
Content was VERY INTERESTING	52%	61%
	(63)	(67)
Content was VERY USEFUL	28%	44%
	(25)	(27)
Discussion Arrangements were ADEQUATE	95%	98%
	(63)	(64)
Printed Materials were VERY INTERESTING	47%	54%
	(45)	(46)
Printed Materials were VERY USEFUL	37%	39%
	(27)	(23)
Information is useful DAILY/WEEKLY	54%	35%
	(59)	(62)

Data from a video seminar broadcast recently (March 5, 1975) is included for a comparison over time. The total audience for this program on Fiberoptic Endoscopy and Sigmoidoscopy was smaller (120) but was also attended by nearly equal number of physicians and nurses. We have seen audience size decline over the months of the experiment. Interview data tells us the early large numbers represented curiosity about the satellite experiment. Audiences are now determined by interest in the topic and available time. This program, like the video seminar on Coronary Arteriography, was designed primarily for physicians.

	M.D.	Nurse
Technical Aspects were GOOD	98%	95%
(Total number reponding)	(41)	(56)
Content was VERY INTERESTING	86%	80%
	(37)	(56)
Content was VERY USEFUL	61%	48%
	(18)	(23)
Discussion Arrangements were ADEQUATE	100%	100%
	(39)	(51)
Printed Materials were VERY INTERESTING	62%	59%
	(26)	(37)
Printed Materials were VERY USEFUL	42%	65%
	(12)	(20)
Information is useful DAILY/WEEKLY	32%	23%
	(34)	(48)

In looking at the responses to these two video seminars, we see several preliminary patterns. Until we have compiled the data series for all video seminars, our remarks hold only for the programs cited. For the Coronary Arteriography seminar the nurses seemed slightly more favorable to all aspects of the program. However, they were less likely to feel the information would be used on a daily/weekly basis than were physicians (35% versus 54%). This is probably explainable since the content emphasized the physicians role. However, it will take additional data to fully account for this since the nurses were more positive about the usefulness of the content (44% versus 28%) and slightly more positive about the usefulness of the printed materials (39% versus 37%).

For the video seminar on Fiberoptic Endoscopy and Sigmoidoscopy the physicians seemed somewhat more positive toward the broadcast. Again the nurses were less likely to feel the information would be used on a daily/weekly basis than were physicians (23% versus 32%). This finding again exists along side the response from nurses that they found the printed materials more useful than physicians (65% versus 42%).

In comparing the two programs, we see the second program was evaluated more highly on all dimensions except frequency of use of the information. Individual interviews will help us interpret these results that may in fact only show random fluctuation around a generally high level of liking and use of the satellite programs. Summary data from all video seminars will show the strong patterns.

GRAND ROUNDS. Surgical Treatment of Peptic Ulcers was the subject of a grand rounds broadcast on September 18, 1974. There were 209 in attendance. Their responses are:

	M.D.	Nurse
Broadcast Reception was GOOD	68%	82%
(Total number responding)	(56)	(76)
Broadcast was VERY WELL PRODUCED	72%	85%
	(58)	(75)
Content was VERY INTERESTING	67%	69%
	(57)	(74)
Content was VERY AUTHORITATIVE	59%	82%
	(54)	(74)
Content was VERY USEFUL	56%	34%
	(54)	(73)
Content was WORTH SEEING AGAIN	50%	71%
	(58)	(65)
Discussion opportunities were AMPLE	72%	90%
	(54)	(69)
Questions were UNDERSTOOD	84%	79%
	(50)	(66)
Questions were WELL ANSWERED	100%	100%
	(52)	(67)
Information is useful DAILY/WEEKLY	65%	47%
	(55)	(66)

The data from Surgical Treatment of Peptic Ulcers, a grand rounds program, shows overall satisfaction with the various aspects of the broadcast. With the exception of usefulness of content, having questions understood, and using the information on a daily/weekly basis, the nurses were more positive. It will be interesting when we can look across a large number of grand rounds and determine the extent to which the information presented is used less by the nurses or the physicians.

We expect to find a matching of positive responses with the intended target audience. For instance, the two programs on Behavior Modification were intended primarily for nurses and were attended primarily by nurses. In looking at the responses of using the information on a daily/weekly basis, we have the nurses answering positively 49% (Behavior Modification I) and 58% (Behavior Modification II) while the physicians answer positively 15% (Behavior Modification I) and 25% (Behavior Modification II).

TELECONSULTATION. Technical Aspects of Dialysis was the subject of a teleconsultation using slow scan that was presented by one VA hospital on December 18, 1974. Including VA and non-VA staff, there were 129 viewing the program. Following are the responses of the presenting hospital, the non-presenting hospitals (9), and the consultants (2).

	Presenting Hospital		Non-Presenting Hospital		Consultant
	M.D.	Nurse	M.D.	Nurse	M.D.
Case presentation was GOOD (Total number responding)	100% (8)	100% (3)	85% (40)	87% (46)	100% (2)
Videotape presentation was GOOD	100% (8)	100% (4)	88% (40)	96% (47)	100% (2)
Slow scan presentation was GOOD	100% (8)	40% (5)	66% (35)	41% (46)	50% (2)
Interaction was GOOD	100% (8)	60% (5)	88% (40)	87% (45)	50% (2)
Potential for teleconsultation is HIGH	63% (8)	40% (5)	42% (43)	59% (49)	50% (2)
Potential of teleconsultation for non-presenters is HIGH	50% (8)	40% (5)	43% (42)	45% (47)	50% (2)

For Technical Aspects of Dialysis we find that the presenting hospital, particularly physicians at the presenting hospital, are more favorable to the experience than those at the other hospitals. The presenting physicians even evaluate the potential of teleconsultation for non-presenters more highly than physicians in the other hospitals. Since the number of medical staff at the presenting hospital is so small, it is difficult to make generalizations or to even put much emphasis on differences in perceptions between presenters and non-presenters other than the overall level.

Since the previous response pattern is specific to one program, it is difficult to sense the attitudes of the consultants. The following information summarizes the consultants' responses for ten presentations:

	Denver Consultants
Case presentation was GOOD	69%
(Total number responding)	(29)
Videotape presentation was GOOD	63%
	(27)
Slow scan presentation was GOOD	37%
	(27)
Interaction was GOOD	43%
	(28)
Potential for teleconsultation is HIGH	83%
	(29)
Potential of teleconsultation for non-presenters is HIGH	78%
	(27)

The consultants seem fairly critical of the technical aspects of the teleconsultations. However, they seem to feel there is high potential for teleconsultation in the future. Comments on individual questionnaires indicate the consultants have several different expectations for the experience that may help clarify these findings for our final report.

The teleconsultation experiment is the most direct attempt to intervene in the medical care process. Consequently, critical incidents of effects are important to the evaluation of its effectiveness. Following are three mini-case studies described by R.D. Hamstra, M.D., moderator of these programs. He writes:

> "A case was presented to our panel of a neoplasm that by biopsy was a lung cancer. The lung cancer came on the background of chronic smoking and pulmonary symptoms strongly suggesting significant emphysema or chronic obstructive disease. When our panel asked whether pulmonary function studies had been done in the patient before he was referred for surgery, the response came that they had not been done. The panel made a strong point that a pneumonectomy in this patient probably

would prove intolerable and incompatible with life. This point had not been appreciated by the doctors managing the patient.

"A second patient comes to mind in which a chest x-ray was presented to the panel. The chest x-ray exhibited a peculiar shadow along the side of the heart in the right hemithorax that had not been present on a routine chest x-ray two years previously. It happened to be that one of the panelists who reviewed this case is a recognized expert in what is known as the 'middle lobe syndrome.' He was quite confident from the x-rays submitted to us and particularly through a slow scan magnification of the lateral x-ray, that this patient did, indeed, have middle lobe syndrome. This is a problem characterized by lung collapse that may or may not be due to airway obstruction and frequently is associated with complications such as abscesses, or recurrent infections. The presenting doctor indicated that the x-ray had been interpreted as a bronchogenic cyst. Since a bronchogenic cyst is considered to be benign and no further action or followup is required, the management of this patient was significantly modified through the panelist's observation and this patient will be brought under more direct and continued medical scrutiny.

"Another case that comes to mind is one that was presented via slow scan. This patient's problem had arisen within a few days of the time of the teleconsultation. The problem was that of chronic lung disease and a new infiltrate in the right lower hemithorax. The patient was hypoxic, and the presenting doctor was asking for some help. A slow scan magnification of the infiltrate in the right hemithorax indicated a central area of clearness, strongly suggesting a localized area of air-trapping. This pattern was a very strong indication for bronchoscopy to our panelists, the feeling being that some kind of obstruction to the airways leading to the lower right lung field was causing the trapped air and contributing to the persistent infiltrate. The presenting doctor indicated that a request for bronchoscopy within his institution had been rejected by the surgeon consultant within the last day or two. The teleconsultation panel unanimously and strongly supported the idea of bronchoscopy and it was our impression that the weight of the panel was sufficient to change the minds of the surgeons in the referring hospital so that this diagnostic procedure was done without further delay."

OUT-PATIENT CLINIC. The Diabetic Patient was presented for the patients, their families, and those concerned with their condition on

September 18, 1974 to 208 viewers. Of those watching the program, 42 were there with respect to their own illness and 172 were there with respect to the illness of someone else. Following are their responses:

	Own Illness	Someone Else's Illness
Broadcast reception was GOOD (Total number responding)	86% (42)	84% (172)
Broadcast was VERY WELL PRODUCED	92% (39)	83% (162)
Content was VERY INTERESTING	95% (41)	82% (165)
Content was VERY AUTHORITATIVE	76% (34)	69% (156)
Content was VERY USEFUL	85% (40)	72% (163)
Content WORTH SEEING AGAIN	92% (37)	85% (144)
Discussion opportunities were AMPLE	65% (34)	82% (144)
Questions were UNDERSTOOD	97% (37)	96% (150)
Questions were WELL ANSWERED	100% (36)	99% (142)
Information is useful DAILY/WEEKLY	83% (41)	73% (147)

The out-patient clinic program on the Diabetic Patient was evaluated very positively both by the patients and by the others in the audience. With one exception, the patients responded more positively than the others. Although the spread between percentages is sometimes quite small, we see evidence that the target audience prefers the program more than others who watch. We note that the patients were less likely to feel there were ample discussion opportunities than were those viewing in respect to someone else's illness (65% versus 82%). This is probably consistent with the other findings for this out-patient clinic. In other words, the patients were more involved in the experience and wanted additional time to discuss the information.

It is important for the reader to keep in mind that the programs chosen for inclusion are not necessarily the best nor the worst. Instead, we wanted to show a range of reactions to these four experiments. Also, the reader needs to note that all interpretation of data is preliminary at this point. Additional analyses will help amplify the patterns. In addition, the data presented here will be juxtaposed with interview data and information from retrospective questionnaires.

ADDITIONAL INSIGHTS

The interviews and comments on questionnaires tell us that some aspects of the experiment are going very well while others are not. Following is a brief synopsis of these points. They are useful in that they provide a context for the specific responses elicited by individual programs.

1. Attendance has declined over the months. Many feel that the medical staff have become more selective in choosing programs to attend.

2. Some feel the two hour programs are too long. Nurses in particular do not like to be away from the wards that long.

3. Some who have requested additional information from Denver have found the delay time is excessive.

4. The early programs had their share of technical difficulties. Some of these are related to equipment failures. Others seem to be related to materials presented in the videotapes where some viewers had difficulties seeing charts and graphs.

5. The necessity of using telephone lines has presented some problems. Some indicate the system is difficult to use (e.g. location of phone in room, procedures for making call, etc.) and others do not want to expose their ignorance in front of so many colleagues.

6. A related problem is that of difficulty in understanding questions asked by medical staff in other hospitals. Many of the physicians are not from the United States and their accents present difficulties.

7. Study guides are needed sooner.

8. The hospital publicizes the programs to physicians in nearby hospitals and to the community. Changes in program schedules makes this hard to do. (Of course, flexibility in meeting the information needs of the medical staff is important. Some program changes evolved because additional programs were added at the request of the medical staff.)

These problems are probably typical of a new experiment. Some have already been worked out. Others are being resolved. And a few simply must wait while we determine their effects on the outcomes of the experiment. These problems need to be balanced against the many favorable comments that have been made. Following are a few of the ways that the experiment is making a difference.

1. In one hospital the cardiac arrest procedure was changed as a direct result of the ATS-6 program on that subject.

2. Another hospital is setting up a critical care course with other hospitals. The interest grew from one of the ATS-6 broadcasts.

3. Most hospitals make videotapes of the programs so that the medical staff can view it at times more convenient than the live broadcast. (This positive development causes two problems for our evaluation. First, the hospitals are not keeping records of the number viewing the videotapes. Second, many of these videotapes are being shared with two of our control hospitals.)

4. Some of the medical staff have noted a new sense of closeness to the other VA hospitals.

5 Panelists who remember names of the medical staff are greatly appreciated and seem to make a difference in the attitude toward the program and its content.

NEXT STEPS

The experimental programs will continue through May 28, 1975. The last program is an open discussion on "Use of Satellites in Biomedical Communications." All comments will be taped for further analysis. By early June, the evaluation staff will be busy creating summaries across all programs for each experiment type. Data from the various measurement techniques will be compared using several analysis procedures. Control variables and partitioning of results will help clarify patterns of knowledge, attitude, utilization, and behavior affected by the experiment. Our final report will be ready by the end of July.

APPENDIX A: Experimental and Control Veterans Administration Hospitals

HOSPITALS PARTICIPATING IN SATELLITE EXPERIMENT

Altoona, Pennsylvania

Beckley, West Virginia

Clarksburg, West Virginia

Dublin, Georgia

Fayetteville, North Carolina

Mountain Home, Tennessee

Oteen, Virginia

Salem, Virginia

Salisbury, North Carolina

Wilkes-Barre, Pennsylvania

HOSPITALS SERVING AS CONTROLS FOR SATELLITE EXPERIMENT

Bath, New York

Butler, Pennsylvania

Chillicothe, Ohio

Huntington, West Virginia

Martinsburg, West Virginia

Murfreesboro, Tennessee

APPENDIX B: Programs Presented During Experiment

Acute and Chronic Renal Failure (Dialysis)
Acute Respiratory Failure (Endotrachael Intubation)
Acute Upper GI Bleeding
Alcoholism Rehabilitation
Antibiotics -- Uses and Abuses
Arrhythmias (Interpretation for CCU)
Arrhythmias (Management of Commonly Occuring)
Behavior Modification Techniques
Biofeedback
Blood and Gases
Cancer Chemotherapy -- Hodgkins Disease; Cancer of the Prostate
Cancer of the Colon (Surgical Treatment)
Cardiac Catheterization
Cardiac Rehabilitation
Cardiology Consultations
Care of the Cancer Patient
Changing Role of the Nurse
Cirrhosis and Ascites
Coronary Arteriography and Cardiac Catheterization
Coronary Care Unit
Death and Dying
Depression
Diabetic Patient
Drug Abuse Rehabilitation
Family Therapy
Fiberoptic Endoscopy and Signoidoscopy
Genital-Urinary Infection
Heart Sounds
Hypertension
Inhalation Therapy
Intractable Angina
Intra-vascular Catheterization Technique
Neurological Consultations
Neorological Diagnostics (Indications for Lumbar Puncture)
Nursing Care of the Cancer Patient
Oral Cancer -- Detection and Treatment
Pathology, Histology, and Tissue Consultations
Patient/Family Orientation
Post-Op Thoracotomy Care
Problem Oriented Medical Record
Psychiatric Consultations
Psycho-Physiological Process
Psychotherapeutic Drugs
Pulmonary Embolism
Radiology Consultations
Respiratory Intensive Care
Solitary Pulmonary Nodule (Bronchogenic Carcinoma)
Schizophrenia
Stroke Rehabilitation
Suicidal Patient
Surgical Treatment of Peptic Ulcers
Ultrasonic in Cardiology (Echocardiography)
Use of Satellites in Biomedical Communications

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